

Dec. 31, 1940.

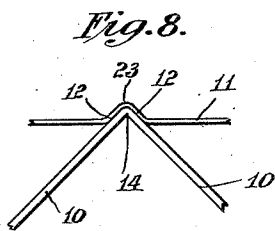
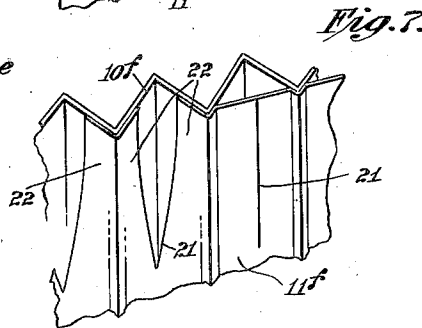
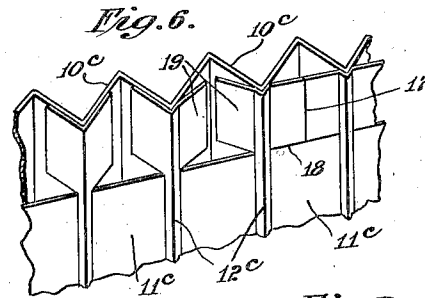
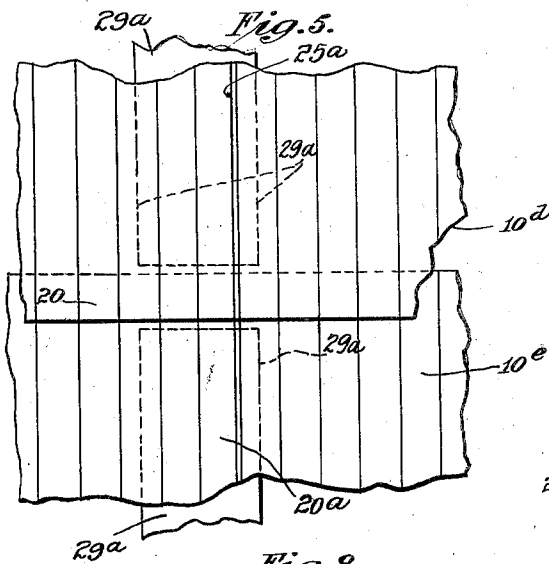
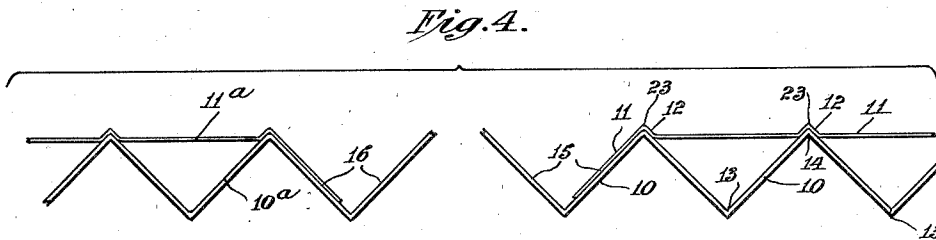
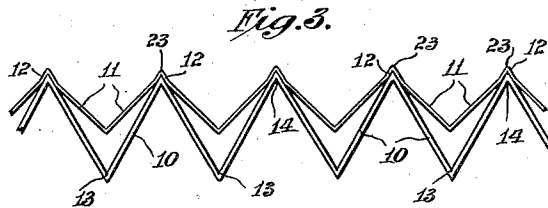
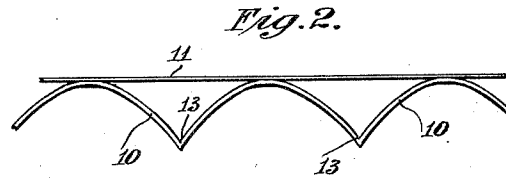
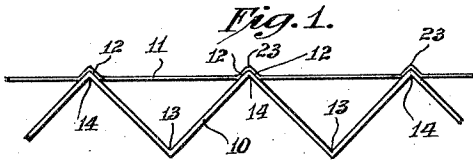
E. L. BENEDICT

2,227,385

PLAITED UNIT

Filed June 15, 1938

2 Sheets-Sheet 1



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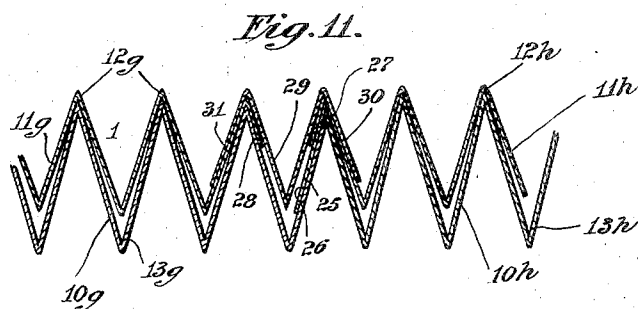
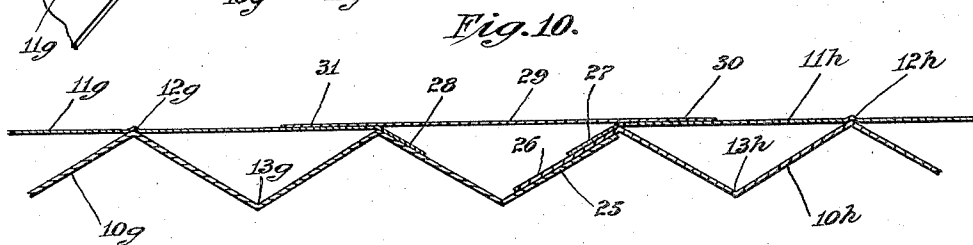
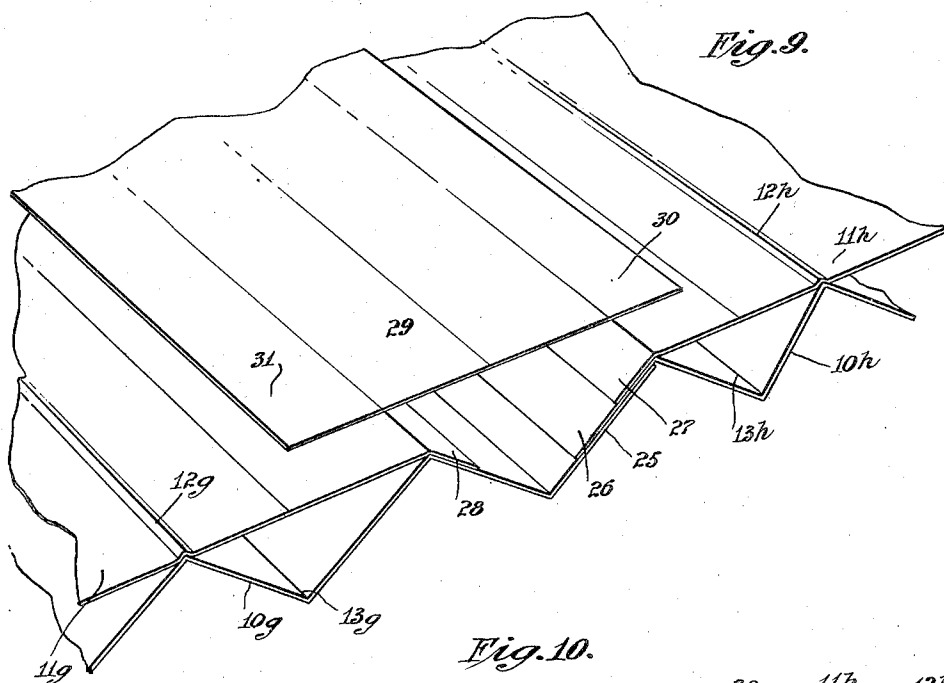
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2,227,385

PLAITED UNIT

Filed June 15, 1938

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,227,385

PLAITED UNIT

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Application June 15 1938, Serial No. 213,841

7 Claims. (Cl. 154-47)

This invention relates to units comprising at-
tached sheets of plaited flexible material for dec-
orative and other purposes in which at least one
backing sheet has its plaits of less depth than the
foundation to limit the lateral expansibility of the
foundation and has for its object to lessen the
tendency of this backing or limiting sheet to be
ruptured by tension.

Another object is to provide an attractive look-
ing unit which is resilient enough to be capable of
automatic opening to a substantial extent.

Another object is to attach the backing which
is generally lighter in weight than the front or
foundation sheet, in such manner that the founda-
tion sheet may be locally flexed in parts on
application of lateral tension of the backing
whereby any tendency for the backing to become
torn may be reduced.

A further object is to provide means for satis-
factorily overlapping such decorative units along
either its longitudinal or lateral edge portions.

Fig. 1 illustrates one embodiment of this inven-
tion.

Fig. 2 shows the device of Fig. 1 when tension
had been applied to the backing resulting in a lat-
eral flexure of slat portions of the foundation.

Fig. 3 shows the device of Fig. 1 in partially ex-
panded or open position.

Fig. 4 shows how the units may be overlapped
along their longitudinal edges or how the oppo-
site edges of the same sheet may be constructed
for overlapping.

Fig. 5 is a front view on a reduced scale of units
transversely and longitudinally overlapped.

Fig. 6 is a rear view showing one way in which
the backing of the front unit may be prepared for
such transverse overlapping.

Fig. 7 shows another way in which the backing
may be prepared for transverse overlapping.

Fig. 8 is an enlarged detail showing how the
foundation sheet is more sharply creased than
the backing.

Fig. 9 is a perspective showing an embodiment
of this invention comprising a splicing sheet.

Fig. 10 is a transverse section through the de-
vice of Fig. 9.

Fig. 11 is a view of the devices of Figs. 9 and 10
partially collapsed.

The foundation 10 is preferably of paper which
is accordion plaited longitudinally. A backing
sheet of flexible plaited material is secured to the
foundation 10 not only at the folds on one side
but also along the rear surface of the foundation
for a substantial area 12 on at least one side of

some of the folds. In the form illustrated the
backing has been attached on both sides for a
substantial distance away from each fold. Pref-
erably a flexible adhesive is used in securing the
backing to the foundation in order that the founda-
tion which is generally of heavier stock than the
backing may possess enough inherent resiliency
at the folds 13 and 14 so that it may have a
substantial inherent tendency to open at least
about as much as shown in Fig. 3 though prefer-
ably enough resiliency to open still more and to
an amount almost or substantially that shown in
Fig. 1.

It will be seen the backing 11 is likewise plaited
longitudinally though the plaits in the backing
are of less depth than those of the foundation.

In order to reduce the danger of the lighter
weight backing being accidentally torn under lat-
eral tension applied to it, Fig. 2 shows how the
backing 11 when drawn more tightly will stress
the slat portions of the foundation 10 and cause
them to be curved as illustrated. This local flex-
ure of the slat portions of the foundation gives
the backing substantial yield and resiliency under
a tensional stress and thus tends to safeguard
it against tearing. The stiffness or degree of re-
siliency depends not only upon the relative char-
acter of the foundation and backing but also to a
substantial extent upon the widths of the areas 12
across which the backing is adhered to the founda-
tion.

If the area 12 is wider than that illustrated in
Fig. 1 then it will be seen the slat portions of the
foundation must be flexed to a greater extent
than is shown in Fig. 2 and the unit is thus more
yieldable or resilient laterally. In applying lat-
eral tension to the backing each slat portion of
the foundation 10 tends to be bowed and the
longer the lever arm, measured by the width of
the attached area 12, the more readily does the
foundation become so bowed. On the other hand,
the narrower the area 12, the shorter is the lever
arm for applying stress to transversely bow or
flex the slat portions of the foundation and the
stiffer and less resilient is the total unit under
lateral tension.

Another reason for making the area 12 of sub-
stantial extent is that when the backing is fully
expanded, the backing when viewed from the rear
still possesses the plaited appearance as is the
case in Fig. 1. It is only when the backing 11 has
been stressed under tension enough to bring all
areas 12 into substantial alignment that the

backing loses its plaited appearance when viewed from the rear.

In Fig. 4 the backing is shown as extending across all but the last pair of slats in the foundation along each edge portion leaving an unbridged pair of slats 15 and 16 which may be nested to provide a convenient means for fastening the longitudinally overlapped edge portions of a unit or units. The adjacent edge portions shown in Fig. 4 may be the opposite edges of a single unit adapted for overlapping for example when the unit is placed around a column to be decorated, or these edge portions may be on different units as may be desired in case the decorative units are to be arranged along a wall to give greater width for the total area to be decorated than can be conveniently covered by a single unit. The nested unbridged V-shaped portions in the foundation in Fig. 4 may be permanently or temporarily secured by some well known form of mechanical fastening means or by the use of adhesive. It makes no difference which edge portion shown in Fig. 4 is placed in front of or behind the other. In other words, the backing 11a and the foundation 10a may be that of a separate unit from the backing 11 and foundation 10 or they may be the opposite longitudinal edges of the same unit.

In Fig. 5 is exemplified the transverse and longitudinal overlapping of these decorative units 10 and 10e as viewed from the front, the transversely overlapped portion 20 being of any desired amount provided the backing of the front unit 10d must, however, be prepared in some manner such as that shown by Figs. 6 and 7 to allow the foundation of the front unit 10d to be nested with the foundation of the lower or rear unit 10e. Otherwise it will be understood from Figs. 1 and 3 for example that the backing when fully or partially extended would prevent a substantial nesting. The longitudinally overlapped portion 20a is of the type shown in Fig. 9, the splicing sheet 29a being shown in dotted lines as being short enough not to need slitting as in Figs. 6 or 7. The longitudinal edge 25a of one of the units is shown in full lines.

Fig. 6 illustrates one way in which the backing 11c of a unit may be treated in order to enable the front foundation 10c to be nested in transversely overlapped relation with the foundation of a rear unit. For this purpose the backing 11c should be provided with longitudinal central slit portions 17 between each of the adhesively secured folds 12c, the slit 17 being at least or slightly longer than the desired overlap. In addition each portion of the backing should be laterally slit as shown at 18 for the width of the backing between adjacent adhesively secured portions 12c, thus forming, as it were, a pair of swinging doors in back of each pair of foundation slats. These swinging doors 19 will then be capable of being brought substantially contiguous the foundation 10c as shown at the left part of Fig. 6, thereby enabling another unit which extends above the one illustrated to be nested by bringing its foundation folds into the V-shaped recesses above the uncut portions of the backing 11c.

In Fig. 7 is illustrated another construction for the backing to permit the same transverse overlap or nesting and in this case the backing portions 11f are slit as shown at 21 for a substantially longer distance than the actual overlapped portions of the two units in order that the sides 22 of the slit may be held contiguous the founda-

tion slats 10f throughout at least the overlapped portion.

Fig. 8 shows how the foundation 10 is creased at its fold 14 more sharply than is the backing 11 which is more rounded as shown by the numeral 23. The foundation is preferably pressure-creased in order to give it the desired resiliency while the backing is not so creased.

With some types of paper it may be desirable to have the adhesive more or less flexible depending on the resilience desired for the fold, it being preferable for the adhesive to be sufficiently flexible so that the resilience of the foundation fold is not destroyed and the unit may be capable of automatically opening to substantially the extent shown by Fig. 1.

With some types of paper used for the foundation it may be desirable to score or attenuate the fold 14 by rendering it thinner and weaker than the rest of the foundation in order not to make the fold too stiff. Such scoring or thinning may be performed on what are known in the art as scoring rolls.

The creasing of the foundation may be done by hand or by the use of some mechanical means for pressure creasing it.

The foundation 10 may be of any suitable material possessing the desired combination of body stiffness and resilience in the folds. For example, a fibrous or beaten pulp paper of weights from 30 pounds to 120 pounds per 3000 square feet have been used and for the backing such paper from 20 to 60 lbs. has been found desirable, the backing preferably being lighter in weight and therefore having less body than does the foundation. Instead of paper alone the foundation may include a paper coated with metal foil or even a heavy metal foil alone, though this is generally too expensive. The backing for each unit may also be of any type of flexible sheet material and may include a foil coated paper or even metal foil alone, especially aluminum foil as that has been found attractive in appearance.

The backing and foundation may be of any desired color or provided with a coating of any desired color and they may be of the same or contrasting colors.

While a feature of this invention resides in having the backing so constructed as to provide the adhesive portions 12 of substantial width when the backing is fully expanded as shown in Fig. 1 without too much tension applied, in order to give the backing the plaited appearance if the backing is exposed, the more usual practice is to have the foundation exposed and the backing not visible.

The decorative units of this invention may be made of any desired width and in convenient lengths or in lengths so long that the units when laterally compressed for shipment must be folded and cut off to whatever lengths are desired. The units of this invention have been found attractive in the decoration of halls, nightclubs and the like, because they should be available at a cheaper price than is bunting and at the same time give a pleasing and attractive appearance. These units may be folded around columns or pillars or may be arranged along walls and ceilings with the plaits extending in any direction. The backing 11 limits the extent to which the foundation may be laterally expanded and therefore insures the unit at all times having the plaited appearance even when stressed under tension as shown

in Fig. 2 inasmuch as the curvature or bowing to the slat portions of the foundation is not particularly noticeable when viewed in plan, although of course when viewed from an end of the unit the local flexing of these slat portions is quite noticeable.

Other types of paper than some of the craft papers described may be suitable for both the foundation and backing. The lateral resiliency which the unit possesses enables the backing to be made of lighter weight, lower grade and cheaper material than is the case where no lateral resiliency is provided in the unit. With the fibrous or beaten pulp type papers wetting only along the folds of the foundation or the folds of the foundation and backing has been found to make the paper stiffer as though starched and this is sometimes desirable especially where the foundation has been scored or thinned to an extent making it otherwise too flexible. A convenient and desirable type of adhesive has been found to be a casein or latex type adhesive containing enough rubber to make the adhesive flexible, yet after setting the adhesive becomes substantially water insoluble. Either or both the foundation and backing may be waterproofed and flameproofed or fireproofed in ways well known in the industry. The foundation, especially the front surface, may if desired be treated with a suitable resinous coating to render the material greaseproof and not in danger of becoming soiled should it be handled.

In the preferred form of this invention the backing is so arranged that the foundation sheet as shown in Fig. 1 has its slat portions making angles of approximately 45° with the vertical or horizontal, in other words making angles of approximately 90° between slat portions. The unit when made about 30 inches wide when expanded as shown in Fig. 1 has been found a convenient and desirable width for handling and shipping. The ability for the material to be laterally compressed for shipment is a desirable feature since the compressed unit takes up so little space.

The described manner of making the foundation slat portions bowed to give the unit lateral yield or resiliency is desirable not only for units of the type illustrated in Fig. 1 but also in such units having another backing sheet similarly secured along the front folds as described and illustrated in my application Serial Number 179,134 filed December 10, 1937, for Machine and process for plaiting, Patent 2,196,006, dated April 2, 1940.

This described construction whether having one or two sheets of backing is of use not only for decorative purposes but desirable to provide a satisfactory type of packing for fragile articles like lamp bulbs. When backing is provided on each side of the foundation and the backing sheets are of metal foil, this application is applicable to thermal insulating units. While the adhesively secured portions 12 have been shown in the drawing as existing on each side of the contiguous foundation folds, it will be understood that these adhesively secured areas need not necessarily exist at each of the substantially contiguous foundation folds nor need they exist on both sides of such a fold since a desirable though less lateral resiliency may be obtained by having the adhesive areas 12 on only one side of some of the folds. Of course the width of the adhesive strip 12 on one slat of the foundation should be a minor portion of the slat width to leave plenty of slat width free to be bowed or flexed. The unit may be overlapped with other units both

longitudinally according to Fig. 4 and transversely according to Figs. 6 or 7, as shown in Fig. 5.

The material of this invention may be used as curtains with the folds either horizontal like Venetian blinds or vertical and in either case may be provided with suitable cords for opening and closing the curtains. When so used the unit may be of the type illustrated or may be provided with an expansion limiting sheet on each side of the foundation and secured to the folds thereof or a cord or cords may be used in place of one or both of the backing or expansion limiting sheets. Such a cord may be secured to the foundation outside thereof or may be knotted and passed through perforations in the slat-like portions of the foundation, which should of course be of heavy material.

The embodiment illustrated in Fig. 9 includes a unit having a foundation 10g with a flexible backing 11g secured to the foundation along attached portions 12g. Another similar unit having a foundation 10h and backing 11h is longitudinally secured to the first unit by having edge portions 25 of the first unit and 26 of the second unit overlapped and adhesively secured together. As shown in Fig. 10 the backing 11h terminates in a portion 27 secured to the backing 10h between a lateral edge of the foundation and the first fold 13h therefrom. The backing 11g of the first unit is terminated in an adhesively secured portion 28. Merely overlapping the foundation portions 25 and 26 and securing them together may suffice to satisfactorily unite the two units where no lateral stress is applied to the backing portions of each unit and their foundations, but where such a stress might be present it has been found desirable to provide a splicing strip 29 also of flexible sheet material substantially similar to that of the backing, which is secured at 30 to the backing 11h and at 31 to the backing 11g. This splicing strip may or may not extend all the way to the top or bottom edge of the foundation or backing or it may terminate short of such top or bottom edge. An advantage of using such a splicing strip is that the overlapped portions of the foundation are made to lock like the rest of the foundation and the overlapping becomes substantially inconspicuous. Of course the splicing strip 29 should be folded in the same manner that the backing sheets are folded because the splicing strip in effect makes one larger and substantially continuous backing where two separate portions had previously existed.

It will be noted the embodiment illustrated in Figs. 9 to 11 inclusive have the plaits of the backing deeper and more nearly equal to the plaits of the foundation with the result that the foundation in this embodiment may be opened wider than the foundation illustrated in Figs. 1 to 4 inclusive.

From the drawings it will be seen that the self expanded material of Fig. 3 is more than half the width of the fully expanded material of Fig. 1.

I claim:

1. The combination with a plaited flexible sheet, of another plaited flexible sheet secured to one side of the first sheet with folds of said sheets substantially contiguous one another, the folds of the first sheet being laterally spaced apart a less distance than in the second sheet, whereby the first sheet may limit lateral expansibility of the second sheet, the improvement which comprises increasing the resiliency of the first sheet when substantially fully expanded laterally by

having the sheets adhesively secured along each side of a fold for a distance away from the fold sufficient to flex portions of the second sheet between folds from a substantially flat surface into a somewhat curved surface when viewed on a lateral cross-section and by the application of tension to the first sheet.

2. The combination with a plaited flexible sheet, of another plaited flexible sheet secured to one side of the first sheet with folds of said sheets substantially contiguous one another, the folds of the first sheet being laterally spaced apart a less distance than in the second sheet, whereby the first sheet may limit lateral expansibility of the second sheet, the improvement which comprises increasing the resiliency of the first sheet when substantially fully expanded laterally by having the sheets adhesively secured along at least one side of several folds for a distance away from the folds sufficient to flex portions of the second sheet between folds from a substantially flat surface into a somewhat curved surface when viewed on a lateral cross section and by application of tension to the first sheet, said second sheet being heavier and stiffer than the first sheet.

3. The combination with a plaited flexible sheet, of another plaited flexible sheet secured to one side of the first sheet with folds of said sheets substantially contiguous one another, the folds of the first sheet being laterally spaced apart a less distance than in the second sheet, whereby the first sheet may limit lateral expansibility of the second sheet, the improvement which comprises increasing the resiliency of the first sheet when substantially fully expanded laterally by having the sheets adhesively secured, said sheets being capable of being compressed laterally and the sheets with the adhesive securing them possessing enough resiliency along the folds such that when laterally compressed they will upon removal of the holding force expand laterally or open automatically for substantially the full width of the first sheet when the folds are arranged substantially vertically.

4. The combination with a plaited flexible sheet, of another plaited flexible sheet secured to one side of the first sheet with folds of said sheets substantially contiguous one another, the folds of the first sheet being laterally spaced apart a less distance than in the second sheet, whereby the first sheet may limit lateral expansibility of the second sheet, the improvement which comprises increasing the resiliency of the first sheet when substantially fully expanded laterally by having the sheets adhesively secured along at least one side of several folds for a distance away from the folds sufficient to flex portions of the second sheet between folds from a substantially flat surface into a somewhat curved surface when viewed on a lateral cross section and by applica-

tion of tension to the first sheet, the folds of the second sheet being scored and the second sheet adjacent its folds which are contiguous the first sheet being compressed to a less depth than is the rest of the sheet.

5. A unit comprising a flexible plaited foundation having a flexible plaited backing with folds of less depth than those of the foundation, at least some of the backing folds secured along some of the foundation folds, the backing limiting the lateral expansibility of the foundation, and another similarly plaited unit of foundation and backing overlapping a transverse end portion of the first unit, the backing of the second unit being longitudinally slit, for at least the length of the overlap, adjacent the backing folds intermediate those contiguous the foundation folds of the second unit and the backing in the second unit being also laterally slit on each side of each of the longitudinal slits to enable the foundation folds of the second unit to nest into the foundation folds of the first unit.

6. The combination with a plaited flexible sheet, of another plaited flexible sheet secured to one side of the first sheet with folds of said sheets substantially contiguous one another, the folds of the first sheet being laterally spaced apart a less distance than in the second sheet, whereby the first sheet may limit the lateral expansibility of the second sheet, the improvement which comprises increasing the resiliency of the first sheet when substantially fully expanded laterally by having the sheets adhesively secured along at least one side of a fold for a distance away from the fold sufficient to flex portions of the second sheet between folds from a substantially flat surface into a somewhat curved surface when viewed on a lateral cross-section and by the application of tension to the first sheet.

7. A unit including an accordion plaited flexible foundation having a plaited flexible backing whose plaits are of less depth than those of the foundation secured along at least some of the folds of the foundation and backing, said backing being also secured to the foundation along a substantial area near the lateral edges thereof, a second unit substantially similar to the first unit having a longitudinal edge portion secured to a longitudinal edge portion of the first unit for a substantial area between a lateral edge of each foundation and the first fold thereof from that edge, and a splicing sheet of plaited flexible material spanning the secured portions of the foundation and secured to the rear face of the backing of each unit, said splicing sheet being of a length such that the secured together portions of the foundations when open or closed have the same general uniform plaited appearance.

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